The LISA Mission Design

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The proposed Laser Interferometer Space Antenna (LISA) is designed to observe gravitational radiation from galactic binaries and massive black holes in other galaxies. LISA will observe waves in the frequency range 0.1 mHz to 1 Hz, which can never be observed on Earth due to background noise. The three LISA spacecraft will be located at the vertices of an equilateral triangle with side length 5 million km. The orbits are chosen so that the triangle formation trails the Earth by 20 degrees. Each spacecraft will contain two independent instruments containing a proof mass, laser and 30 cm diameter telescope for the transmission and reception of laser signals. Two independent Michelson interferometers will be formed, allowing both polarizations of gravitational waves to be detected. The observed signals will yield unique information about the formation of massive black holes and the nature of gravity in the high-field limit.